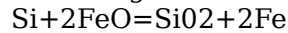


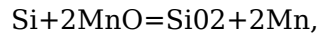
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small amounts as reducing agents. Owing to this the properties of these substances, as well as the properties of their products of oxidation, are decisive of the course of the process.

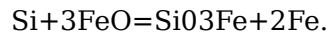
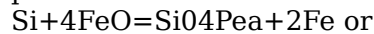
Silicon, for example, is able to react on iron or manganese oxide, but this cannot happen according to the formula



or



since by the reaction conditions present silicic acid cannot originate in the free condition, and must generally appear in the form of chemical compounds, and it finds the necessary base for these in a most convenient manner in the agent itself, from which it removes a portion. The reaction occurs according to the formulae



The iron protoxide (or manganese protoxide), which is still contained in the last-named iron or manganese bi-silicate, is now protected against further change by means of silicon, so long as chemical influence from other materials is absent. If it be transformed into the free state in the way described, it can again be attacked by silicon.

Phosphorus can likewise become a reducing agent for metallic oxides, notwithstanding that its oxidation product as phosphoric acid cannot occur in the free condition. It must generally, like the silicic acid, seize a portion of the metallic oxide and be converted into metallic phosphate.

Manganese is able to remove the oxygen from iron protoxide and is converted thereby into the strongly basic manganese protoxide, which in the presence of acids seeks to attain possession of them. If no free acids are present, the manganese is able to displace iron from iron silicate, and in this act, as is apparent from the formula

